

Remarks

The Examiner has objected to the Abstract and has requested a correction in accordance with MPEP § 608.01(b). Kindly replace the present Abstract with the rewritten Abstract set forth in the section of this paper entitled "Amendment to the Specification". Applicants submit that the amended Abstract containing only one paragraph obviates the present objection.

Claims 1 through 18 have been rejected under 35 U.S.C. 102(a) as being anticipated by U.S. Patent No. 5,853,570 (Hatanaka et al.).

Applicants respectfully traverse the subject anticipation rejection.

MPEP § 2131 provides:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim."

In contradistinction to Applicants' process, Hatanaka et al. discloses a process to desulfurize a gasoline feedstock whereas Applicants' process discloses a process for the desulfurization of a distillate feedstock. The differences in feedstocks is significant. Because of the lower boiling range of a gasoline feedstock, the percent feed vaporization is high and often 100% when a hydrodesulfurization desulfurization process is carried out at typical commercial hydrogen circulation rates to oil ratios. Because distillate feedstock is much heavier than gasoline, a substantially higher hydrogen circulation rate is required to fully vaporize a distillate feedstock compared to a gasoline feedstock. Those skilled in the art would be detracted from operating distillate desulfurizers at such high hydrogen circulation rates due to the high costs to circulate that much gas at high pressure.

In contradistinction to prior art at prejudices, Applicants have discovered an unexpected benefit to increasing hydrogen circulation rates and percent vaporizations to levels not disclosed for use within a distillate feedstock.

5       The Examiner has rejected Claims 10 through 18 under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. in view of U.S. Patent No. 4,061,562 (McKinney et al.). Applicants respectfully traverse the subject obviousness rejection for the reasons discussed below.

10       The McKinney et al. process is directed to a process for the thermal cracking of hydrodesulfurized resid in contradistinction to Applicants' process for the deep desulfurization of a distillate feedstock. Applicants have discovered that if the hydrogen circulation rate is at least 5 times the chemical hydrogen consumption rate and if the vaporization is at least 30 mole %, one can achieve the deep desulfurization of the  
15       distillate including the "difficult to desulfurize" species (see page 8 line 30 through page 9 line 20 and page 11, line 3 through page 12, line 30 of Applicants' specification). Applicants have postulated that because of the high vaporization required by Applicants' process and achieved by increasing the hydrogen circulation rate, Applicants increase the liquid phase mole fractions, partial pressure, and reaction rate of "difficult to  
20       desulfurize" species. This results in the ability to remove these "difficult to desulfurize species" and achieve the deep desulfurization. The McKinney et al. teachings are silent about the significance of Applicants' vaporization and hydrogen circulation rates and the use of these parameters to achieve deep desulfurization. McKinney et al. fails to appreciate the beneficial effects afforded by maintaining the vaporization level in  
25       accordance with the process of the invention. Indeed, McKinney et al. teaches at column 9 lines 59 through 64 that low-sulfur selective reactions are a general characteristic of resid oil desulfurization due to the presence of aromatics derived from resins and asphaltenes not present in distillates. This teaching would imply that the relatively high rate of hydrogen circulation required in Applicants' invention would not be  
30       required to effect deep desulfurization of a distillate due to the absence of the resins and asphaltenes.

Additionally, the Examiner has rejected Claim 19 under 35 U.S. C. 103(a) as being unpatentable over Hatanaka et al. in view of U.S. Patent No. 6,231,753 (McKnight

et al.). Applicants' are not claiming a two-stage hydrodesulfurization process as such. Applicants' are claiming a two-stage hydrodesulfurization process where the second stage is operated at a hydrogen circulation rate of at least 5 times the molar rate of chemical hydrogen consumption and wherein the percent vaporization of the feedstock is at least 30 mole percent. Neither Hatanaka et al. nor McKnight et al. teach or suggest such a two-stage process. Accordingly, Applicants respectfully request that the Examiner withdraw the instant rejection of Claim 19.

In view of the preceding discussion and the amendments made herein, it is submitted that all of the claims pending in the subject applications are patentable over the cited references. Therefore, it is submitted that the subject application is in condition for allowance and such action is respectfully submitted.

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Respectfully submitted,



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